BREEDING *EURODRYAS AURINIA* ROTT. AB. *VIRGATA* TUTT

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E. aurinia ab. *virgata* is characterized by having the central row of upperside forewing black spots greatly reduced or absent, leading to the pale markings extending to form a pale median fascia (Porter, 1989). It is a form that probably occurs from time to time in most colonies of this species, although extreme forms are rare. Some colonies, however, have produced well-developed forms on a regular basis. Hod Hill in Dorset was, in the past, one such locality.

In the field transitional forms from type through to extreme *virgata* may be found, which would suggest that this is an example of multifactorial/polygenic variation. In this type of variation 'a number of different genes may have similar effects and, should they act cumulatively, they may give rise to a graded series of varieties in which distinct segregation cannot be recognised' (Ford, 1945). This is as opposed to recessive, dominant or semidominant aberrations in which a single mutant gene is responsible for the variation, and will, when bred, 'produce two or three clear cut classes' (Berry, 1977) of aberrations in the subsequent generations.

It appears that the terms 'multifactorial' and 'polygenic' (and hence 'single-factor' and 'monogenic' when discussing single mutant genes) are synonymous, as various authors have used one or the other to describe the same phenomenon. Multifactorial is used by Ford (1945) and Berry (1977), whereas Ford (1964), Robinson (1971) and Robinson (1990) use polygenic. Kettlewell (1973) uses both as a heading to his paragraph on this form of variation.

In June 1990 a worn male *virgata* was taken in Dorset. This was placed in a cage with a fresh, wild-captured typical female, and a pairing was soon observed. As the male of this species leaves a permanent plug after mating to ensure that the female will not pair again, it was certain that the female had not mated previously. Two batches of eggs were laid and a brood of approximately 120 adults reared the following spring. This contained two male *virgata* (not extreme), and a small number of transitional forms in the male. All females were of the typical form, as were the rest of the males. A pairing was obtained between a transitional male and a typical female. The weather at this time was cold and windy, and the female waited 7 days before pairing. A single batch of eggs was deposited.

In the spring of 1992 about 100 larvae emerged from hibernation, but they were weak, and many more succumbed to disease than is usual in this species. About 50 adults emerged. The whole brood was graded from type to fully developed *virgata* in both sexes (a male is illustrated here). Expecting pairing to be as easily achieved as is usual with *aurinia*, a number of the most extreme adults were placed in breeding cages, but despite continuous warm and sunny weather no pairings were observed and no eggs laid. The brood was weak, with a number of deformed adults and some that were unable to hang onto the netting of the emergence cage for long enough to allow full expansion of the wings.

The graded nature of the brood supports the suggestion, based on fieldwork, that this variation is multifactorial/polygenic, and it clearly has a weakening effect on the aberrant individuals. This is very much in line with the classic study of a colony of *aurinia* near Carlisle over a period of 55 years as described by H. D. and E. B. Ford (1930) and summarized by E. B. Ford (1945). Here variation increased dramatically when the population rose sharply from a period of scarcity, and many of the aberrations were weak or deformed. They described and illustrated an aberration (*virgata*) which appears to have been the most frequent form of variation in this colony

Fig. 1. *Eurodryas aurinia* Rott. ab. *virgata* Tutt (×1.5 life size).

during a 6-year period of extreme abundance of the species (1894–1899). When the population stabilized aberrations were hard to find. (R. M. Craske (*pers. comm.*) made similar observations during a population explosion of the species near Plaistow, Sussex in 1945/6.) The authors attributed this phenomenon to the fact that weaker, aberrant individuals would have a chance to survive to become adults during a period in which the population was increasing in size from a point far below its average towards its optimum size. This is because, during a period of increasing population size, selection would be less intensive than when the population reached its optimum level.

References

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SHORT COMMUNICATION

The white-letter hairstreak in south-east London.—One the warm and muggy morning of 17.vii.1994 a large *Buddleja* bush in Nunhead Cemetery, London SE15, attracted only a single butterfly, a rather battered white-letter hairstreak, *Strymonidia w-album* (Knoch). This was the first time I had encountered the species in Nunhead, although a dead hairstreak caterpillar was brought to me, from the cemetery, some years ago. The several hundred large English elms, *Ulmus procera* Salisb., which punctuated the cemetery grounds were killed in the 1970s by Dutch elm disease; many of their trunks still lie prostrate in wooded corners. Suckers and saplings are regenerating; they now reach about 6 m high and the disease is reappearing to kill a few each year. The butterfly is obviously very local in the London area, but its appearance in Nunhead (vice-county 17, "Surrey") may support ideas that it is recolonizing as elms regrow.—Richard A. Jones, 13 Bellwood Road, Nunhead, London SE15 3DE.